ſend it to the Royal Society, with a Figure of the Infant, with the Parts in their proper *Site.* One thing I cannot paſs in Silence, *viz.* how the Circulation could be carried on, the Heart being thus inverted; and yet the Child lived ſeveral Days after Birth. I obſerved the Heart from its Baſis, whence the *Aorta* and pulmonary Artery ſpring, and where the *Cava* and pulmonary Vein enter it, to its Cone, ſurrounded looſely with ſeveral Windings of theſe Veſſels, through which the Blood's Circulation muſt neceſſarily be performed. A wonderful Sagacity in Nature! but I ſhall reſerve the reſt for my Tract.

---

## VIII. Johannes Caſtillioneus *D$^{no.}$ de* Montagny, *V.D. Philoſoph. Prof. in Acad.* Lauzanneſi, *Reg. Soc.* Lond. *Soc. &c. de Curva* Cardioïde, *de Figura ſua ſic dicta.*

S. P.

NON ignoro, V. C. novarum curvarum inveſtigationem, tanquam nimis Analyſtis facilem, contemni: Cum tamen D. *Carré*, non mediocris Geometra Regiæ Scientiarum Academiæ, (28 Feb. 1705.) novam curvam, quanquam *vix ſumma ſequens faſtigia rerum*, proponere non dubitârit; cur tibi, viro in amicos benigniſſimo, nonnulla, quæ mihi ejuſdem *Carré* diſſertationem legenti venerunt in mentem, ſcribere non auſim? Sed proœmiis omiſſis, ad rem.

Semicirculi *BMA*, (Fig. 1. 2. 3. Tab. III.) diameter *BA*, ita, puncto *B* peripheriam radens, ut ſemper tranſ-

The Royal Society is collaborating with JSTOR to digitize, preserve, and extend access to
*Philosophical Transactions (1683-1775).*
www.jstor.org

tranſeat per punctum $A$ gignet curvam, de qua agitur.

Ex generatione patet,

1°. Quod $DA\alpha$ normalis ad $AB$, æquat diametri duplum.

2°. Quod hujus curvæ peripheria $ADNa\alpha NA$ finiet in $A$.

Curvam hanc a figura *Cardioïdem*, ſi placet, appellabimus.

Jam per $a$, & $A$ ducantur $aE$, $AQ$ normales ad $aA$, & ubi libet $EN$ normalis ad $aE$: Ex geneſi erit $AN = BA \pm AM$, & (per ſimilitudinem triangulorum $QAN$, $MBA$) $AQ = BM \pm MP$, ac $NQ = MA \pm AP$.

Hæc eſt præcipua hujus curvæ proprietas, altera non injucunda eſt, quod recta $NN$ ſemper æquat diametri duplum, & ſemper a circulo biſecatur in $M$.

Sit nunc $BA = a$, $aE = x$, $EN = y$, Erunt $QN = \mp y \pm 2a$, $AN = \sqrt{x^2 + y^2 - 4ay + 4a^2}$, & $MA = \mp a \pm \sqrt{x^2 + y^2 - 4ay + 4a^2}$; quæ quatuor lineæ per analogiam comparatæ, dant æquationem ad curvam.

$$y^4 - 6ay^3 \left.\begin{matrix} + 2x^2y^2 - 6ax^2y + x^4 \\ + 12a^2y^2 - 8a^3y + 3a^2x^2 \end{matrix}\right\} = 0$$

Curvæ ſubtangens juxta vulgatas methodos, eſt

$$\frac{2y^4 - 9ay^3 + 2x^2y^2 + 12a^2y^2 - 3ax^2y - 4ay^3}{6axy - 2xy^2 - 3a^2x - 2x^3} = \frac{\dot{x}}{\dot{y}}$$

Sed ex curvæ generatione facilior ducendæ tangentis ratio deduci poteſt. Veniat $MAN$ in locum primo quamproximum $mAn$, ſumantur $AR = AM$, & $Ar = AN$, & junctis $MR$, $Nr$, ducatur per $A$ recta

$AT$ iis parallela, & per $Mm$, $Nn$, rectæ $MT$, $nt$. Jam $nA : At :: nr$ (vel $mR$) $: rN :: mR \times MA : rN \times AM :: mR \times MA : MR \times AN :: MA \times Am : AN \times AT$, ſed in ultima ratione $mA = MA$, & $TA$ normalis ad $MN$, quare $nA : At :: \overline{MA}^2 : AN \times AT$; ſi nunc ex $M$ ducatur per circuli centrum $F$, recta $MF$ producenda, donec. rectæ $TA$ item productæ occurrat in $G$, id eſt, uſque ad circuli peripheriam, erit $\overline{MA}^2 = TA \times AG$; quapropter $nA : At :: AG : AN$; deſcribatur igitur ſemicirculus per $G$, & $N$, qui ſecabit rectam $AT$ in $t$, ex quo ducta recta $tN$ erit tangens ad curvam, ad quam inſuper recta $NG$ eſt normalis; hinc jungantur $MO$, cui ex $N$ ducatur parallela, quæ tanget curvam.

Hic obiter notandum puto hanc ducendarum tangentium methodum probe convenire pluribus curvis.

Sit $AB$, Fig. 2. Conchois Nicomedæa: Tunc (ſuppoſita ſuperiori præparatione) $BP : Pt :: BR$, (vel $cr$) $: Rb :: cr \times CP : Rb \times CP$, (vel $rC \times PR$) $:: \overline{CP}^2 : TP \times PR$, unde deducitur ſuperior conſtructio.

Recta longitudinis datæ Fig. 3. $CPB$, extremitate $C$ radens rectam $CDT$ ad $DA$ normalem, ſemper tranſeat per punctum $P$ datum in ipſa $DA$, & ita curvam $AB$ gignat.

Superiorem præparationem, & ratiocinium huic aptans habebis $BP : Pt :: bR$ ($rc$) $: RB :: cr \times CP : RB \times CP$ ($BP \times rC$) $:: \overline{CP}^2 : BP \times PT$, ut ſupra. Piget plura referre.

Cæterum methodus de *maximis, & minimis* dat maximam ordinatam $= \frac{9a}{4}$, & ejus abſciſſam $= \frac{a}{4}\sqrt{3}$. Poſſet eodem pacto inveſtigari abſciſſarum maxima; ſed

ſed *longæ ambages, ſeries ſed longa* laborum; quare ſic eam quærito.

Quia $EN$, Fig. 1. eſt tangens ad curvam, recta $MG$ ex puncto $M$ per centrum $F$ ducta determinat punctum $G$, ex quo ducta $GN$ eſt normalis ad $EN$, ergo & ad $Aa$, ex hypotheſi, ſed $NQ = AV = MA + AP$; ergo $VP = MA$; atqui $BA : AM :: MA : AP$; ergo $BA : PV :: VP : PA$; ſed $PF = FV = a - 2z$; & ideo $a : a - 2z :: a - 2z : z$. Unde facile deduitur $z = \frac{a}{4}$, $EN = \frac{7a}{4}$, $AQ = \frac{3a}{4}\sqrt{3}$. Ubi notandum quod idem punctum $M$, quod præbet in recta $NAMN$ punctum majoris ordinatæ, præbet etiam punctum majoris abſciſſæ.

Sed jam ſatis patientia tua abuſus videor: quare finem faciam, nonnulla alia, quæ de hac curva commentatus ſum, propediem miſſurus, ſi putes hæc & ſimilia non indigna, quæ a te ſubciſivis horis legantur. Vale,

Vir, *quo neque candidiorem*
*Terra tulit, neque cui me ſit devinctior alter.*

Viviaci, pridie Kalendas Apriles 1741.

---

## IX. *Ad Eclipſes Terræ repræſentandas, Machina* J. And. Segneri, *Med. Phyſic. & Mathem. Prof.* Goetting, R. S. S.

UT eclipſis aliqua terræ oculis exhibeatur ſpectanda, projectio arcuum & circulorum, qui in hemiſphærio terræ illuminato concipiuntur, in planum, ſervire poteſt egregie: Sique in ejuſmodi pro-

*Fig. 1.*

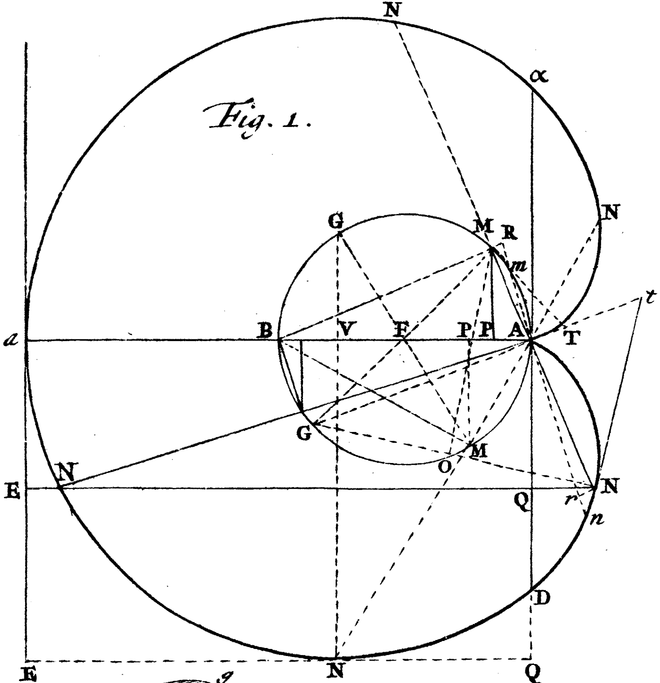


*Fig. 2.*

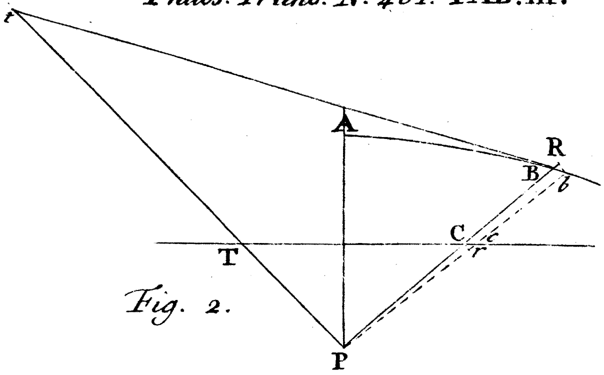


*Fig. 3.*

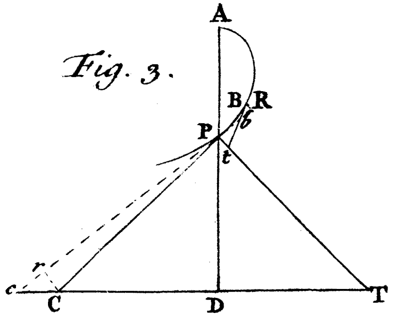
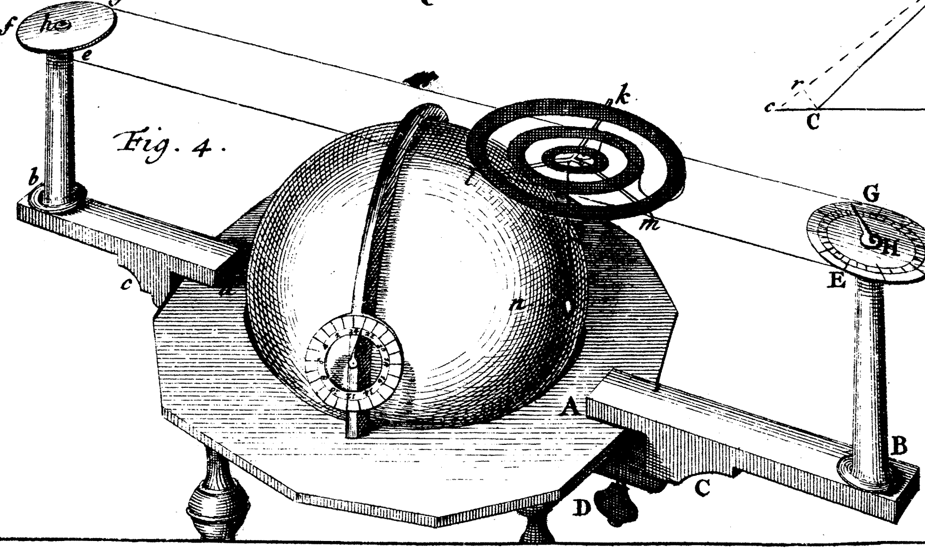


*Fig. 4.*



*J. Mynde sc.*